

CLAIMS

1. Method of purifying waste water charged with organic materials, the method including a step in which the waste water remains in a biological treatment system (3), referred to as the main biological treatment system, in which said organic materials are degraded by micro-organisms to produce sludge, some of the sludge being subjected to ozonation combined with mechanical stirring before it is sent to the main biological treatment system (3), the sludge subjected to ozonation in this way being referred to as "treated sludge", characterized in that during the mechanical stirring step sufficient mechanical energy is imparted to said treated sludge to attack the cell walls of the bacteria and other micro-organisms contained in the treated sludge, this mechanical energy being from 50 kJ/kg to 3 000 kJ/kg of dry material in the treated sludge, and in that from 0.001 g to 0.2 g of ozone per gram of dry material in the treated sludge are consumed during the ozonation step.

2. Method according to claim 1, wherein the pH of the treated sludge is always from 6 to 9.

3. Method according to claim 1 or claim 2, wherein the treated sludge is mechanically stirred before its ozonation.

4. Method according to claim 1 or claim 2, wherein the treated sludge is mechanically stirred after its ozonation.

5. Method according to claim 1 or claim 2, wherein the mechanical stirring and the ozonation of the treated sludge take place in the same reaction enclosure (23).

6. Method according to claim 1 or claim 2, wherein a particular flowrate (Q1) of treated sludge, referred to as the first flowrate, is taken from the outlet of an ozonation reactor (16, 23) in which the treated sludge is subjected to ozonation, this first flowrate is then subjected to mechanical

stirring, and said first flowrate is then sent to the ozonation reactor (16, 23) with a particular additional flowrate (Q2) of sludge from the main biological reactor, referred to as the second flowrate, the second flowrate (Q2) being lower than the first flowrate (Q1).

7. Method according to any preceding claim, wherein the treated sludge is subjected to aerobic or anaerobic digestion in addition to ozonation and mechanical stirring.

8. Method according to claim 7, wherein the aerobic or anaerobic digestion takes place after ozonation and mechanical stirring.

9. Method according to claim 7, wherein a particular flowrate (Q3) of the treated sludge is taken from the outlet of a digester (11) in which the treated sludge undergoes the aerobic or anaerobic digestion and this flowrate of treated sludge is then subjected to mechanical stirring and ozonation before it is sent to the digester (11) with a particular additional flowrate (Q4) of sludge from the main biological reactor.

10. Method according to any of claims 7 to 9, wherein the main biological treatment system (3) is sent only some of the treated sludge that has been subjected to aerobic or anaerobic digestion and further treated sludge leaving the digester is evacuated.

11. Method according to any preceding claim, wherein the ozonation step is implemented in an ozonation reactor (16) which includes at least one vent (20) from which exits a gaseous effluent including at least ozone and oxygen, the method further including a step of collecting this gaseous effluent and re-using said gaseous effluent to treat the waste water or other liquid resulting from the treatment of the waste water.

12. Method according to claim 11, wherein the ozone contained in the gaseous effluent collected from the outlet of

the vent (20) is destroyed before said gaseous effluent is re-used.

13. Method according to any preceding claim, wherein the treated sludge is subjected to ozonation in a pressurized
5 ozonation reactor (16).

14. Method according to any preceding claim, wherein the waste water is subjected to a clarification step after passing through the main biological treatment system (3) and in which at least the sludge to be treated by ozonation and mechanical
10 stirring is separated from said waste water.

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